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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/089,712	04/01/2002	Tetsuhiko Takahashi	1141/67087	2762

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EXAMINER	
VARGAS, DIXOMARA	
ART UNIT	PAPER NUMBER
2859	

DATE MAILED: 12/19/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/089,712	TAKAHASHI ET AL.	
	Examiner	Art Unit	
	Dixomara Vargas	2859	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *14 November 2003*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,9-15 and 17-30* is/are pending in the application.

4a) Of the above claim(s) *2-8 and 16* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,9-15 and 17-30* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

13)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

a) ☐ The translation of the foreign language provisional application has been received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Election/Restrictions

1. The restriction requirement made in the office action dated June 9, 2003 is herein repeated and made ***Final***. The claims 2-8 and 16 are withdrawn from consideration.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

3. Claims 1, 9-15 are rejected under 35 U.S.C. 102(e) as being anticipated by Mock (US 6,259,250 B1).

With respect to claims 1, 9 and 15, Mock discloses a MRI apparatus comprising (Figure 1): a magnetic field generating means for producing NMR in the object to be examined (Figure 1, #28 and #36), detecting means for detecting NMR signals emitted from the object (Figure 1, #36 and #42), control means for controlling magnetic field generating means and detecting means (Figure 1, #46), computing means for visualizing morphology or functions of the examined object using the NMR signals detected by the detecting means (Column 4, lines 38-47; Figure 1, #54) and display means for displaying the computed results as images (Figure 1, #62), wherein the control means operates so that a step of acquiring a plurality of NMR signals as

image-forming data at one excitation is performed continuously and, between image-data-acquiring steps, a step of acquiring correction data plural times at a desired interval is performed (Columns 6-7, lines 20-67 and 1-23 respectively), and the computing means comprise means for producing a correction data group, which includes temporal variations in the interval, using a plurality of the correction data acquired at a desired interval and means for correcting the image-forming data using correction data from among the correction data group, which correspond to acquisition time of the image-forming data (Abstract).

4. With respect to claim 10, Mock discloses the computing means reverses data arrangement corresponding to the polarity of gradient magnetic field pulses after acquisition of the image-forming data (Column 8, lines 6-7; Figures 2, 4, 7 and 8).

5. With respect to claim 11, Mock discloses a plurality of image-forming data acquired continuously between acquisitions of the correction data by the control means corresponds to one image (Column 3, lines 1-3).

6. With respect to claim 12, Mock discloses a plurality of image-forming data acquired continuously between acquisitions of the correction data by the control means is for an identical slice and 2D images of the slice are display successively on the display means (Column 5, lines 45-54).

7. With respect to claim 13, Mock discloses a plurality of image-forming data acquired continuously between acquisitions of the correction data by the control means is for an different slices and 2D images of the plural slices are display successively on the display means (Column 8, lines 30-33).

8. With respect to claim 14, Mock discloses a plurality of image-forming data acquired continuously between acquisitions of the correction data by the control means is for adjacent slices, and the computing means produces a 3D image using 2D image data and displays the 3D image on the display means (Figure 9).

Claim Rejections - 35 USC § 103

9. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

10. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

11. Claims 17-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mock (US 6,259,250 B1) in view of Van Den Brink et al. (US 6,076,006 A).

With respect to claims 17 and 18, Mock discloses the claimed invention as stated above in paragraph 3, except for the computing means producing a correction data group by performing linear interpolation using adjacent correction data. However, Van Den Brink discloses

producing a correction data group by performing linear interpolation using adjacent correction data (Column 6, lines 18-28). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use linear interpolation from adjacent data to produce the correction data as taught by Van Den Brink with Mock's MRI apparatus for the purpose of correcting the magnetic field generated and obtaining a better image quality by reducing the image artifacts.

12. With respect to claim 19, Mock discloses the computing means produces correction data corresponding to the acquisition time of the image-forming data as the correction data group and corrects the image-forming data by the correction data produced corresponding to the acquisition time of the image-forming data (Columns 6-7, lines 20-67 and 1-23 respectively).

13. Claim 20 and 27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mock (US 6,259,250 B1) in view of Ehman et al. (US 6,184,682 B1).

With respect to claims 20 and 27, Mock discloses the claimed invention as stated above in paragraph 3, except for the computing means producing the correction data group using correction data subjected to one-dimensional Fourier transform in the readout correction data, and corrects the image-forming data subjected to one-dimensional Fourier transform in the readout direction by the correction data group corresponding to the acquisition time. However, Ehman discloses producing the correction data group using the correction data subjected to one-dimensional Fourier transform in the readout correction data, and corrects the image-forming data subjected to one-dimensional Fourier transform in the readout direction by the correction data group corresponding to the acquisition time (Column 7, lines 30-42). Therefore, it would

have been obvious to one of ordinary skill in the art at the time the invention was made to perform data correction subjected to one-dimensional Fourier transform in the readout correction data and correcting the image-forming data subjected to one-dimensional Fourier transform in the readout direction by the correction data group corresponding to the acquisition time as taught by Ehman with Mock's MRI apparatus for the purpose of reducing the processing time and correcting the magnetic field generated for obtaining a better image quality.

14. Claims 21-26 and 28-30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mock (US 6,259,250 B1) in view of Ehman et al. (US 6,184,682 B1) and in further view of Van Den Brink et al. (US 6,076,006 A).

With respect to claims 21, 22, 24, 25, 28 and 29, Mock and Ehman disclose the claimed invention as stated above in paragraphs 3-13, except for the computing means producing the correction data group by linear interpolation using adjacent correction data. However, Van Den Brink discloses producing the correction data group by interpolation using adjacent correction data (Column 6, lines 18-28). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use linear interpolation using adjacent correction data to produce the correction data as taught by Van Den Brink with Mock's MRI apparatus for the purpose of correcting the magnetic field generated and obtaining a better image quality by reducing the image artifacts.

15. With respect to claims 23, 26 and 30, Mock discloses the computing means produces correction data corresponding to the acquisition time of the image-forming data as the correction

data group and corrects the image-forming data by the correction data produced corresponding to the acquisition time of the image-forming data (Columns 6-7, lines 20-67 and 1-23 respectively).

Response to Arguments

16. Applicant's arguments filed November 14, 2003 have been fully considered but they are not persuasive.

17. Applicant argues the following:

> In contrast, the Mock reference (as understood) proposes computing correction factors from image data acquired by alternately inverting the readout gradients. See Fig. 6. As understood, the Mock reference does not propose acquiring correction at times between acquisitions of image data (i.e., data for k-space that will be used to reconstruct an image for display). The Mock reference mentions that it is undesirable to acquire reference scans at each scan location. See column 2, lines 25-30.

18. The examiner Disagrees with applicant arguments because the correction factors are acquired for each individual line of k-space data acquired and applied prior to each acquisition (in between the multiple acquisitions) (Column 7, lines 12-36).

Conclusion

19. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL.** See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO

MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

20. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dixomara Vargas whose telephone number is (703) 305-5705. The examiner can normally be reached on 8:00 am. to 4:30 pm..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Diego Gutierrez can be reached on (703) 308-3875. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9306 for regular communications and (703) 872-9306 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

Dixomara Vargas
Art Unit 2859
December 11, 2003

Diego Gutierrez
Supervisory Patent Examiner
Technology Center 2800